EVMS: INTERPRETATIONS, DATA AND AUTOMATION

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EVMS Pilot Objectives

- **EVMSIH will be reassessed, tested, appropriately automated (to the greatest extent practicable)**
- **Automated, data driven approach to be ready for use by other DOE Projects having DOE O 413 EVMS requirements**
- **DOE PM will be able to certify the CNS EVMS using a streamlined approach to demonstrate EIA-748 compliance**
- **DOE PM will be able to incrementally release EVMSIH 3.0**

Automate | Demonstrate | Replicate

EVMS Pilot Goal

Traditional Approach

?

Automated, Data Driven Approach

1. Increase Consistency

2. Reduce Complexity

3. Remove Costs

Coming Soon! Defense AT&L: May-June 2017

CNS EVMS Pilot Timeline

• EVMS Pilot Charter	May 2016
• Kick off @ Oak Ridge, TN	May 2016
• Build | Deploy | Test	Jun – Nov 2016
• Full Testing Protocol	Dec 2016
• Process Preliminary Results	Nov – Mar 2017
• PM Report & Recommendations	Mar 2017
• EVMSIH 3.0 (Incremental Release)	May – Oct 2017

Long-term Strategy (Future Pay-off)

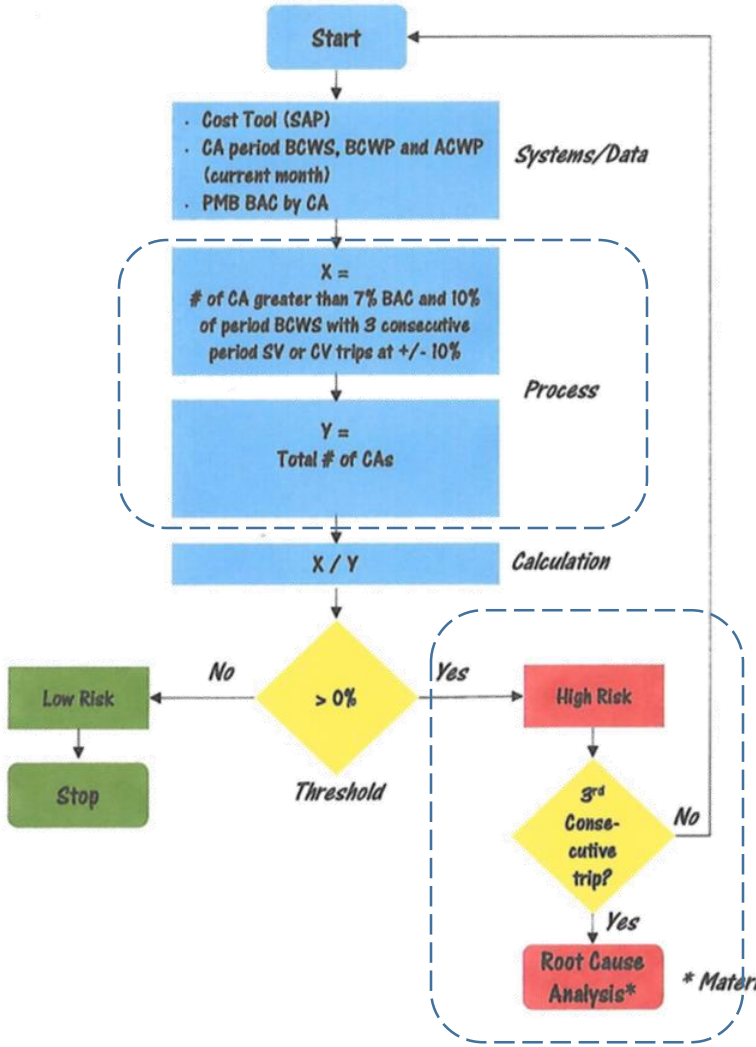
- **Efficient System Design and Development**
- **Remote Monitoring**
- **Rapid Response Teams**
- **System Maturity Scoring**
- **Positions DOE for EVMS Reciprocity (OMB)**
- **Effective Self-Governance**
- **Better Project Management**

Cost Savings!

EVMS Compliance Automation – Lessons Learned

- **Create a culture of change that fosters the digital transformation**
- **Do not expect perfection in the beginning stages**
- **Innovation requires a mindset shift – trust the data**
- **Stay the course - pursue the goal regardless of obstacles or criticism**

EVMS Compliance Automation (Cont.)



Organization

5.A.5 Test 1 (b) – CAM Span of Control

5-A-5. ARE CONTROL ACCOUNTS ESTABLISHED AT APPROPRIATE LEVELS BASED ON THE COMPLEXITY OF THE WORK AND THE CONTROL AND ANALYSIS NEEDED TO MANAGE THE WORK EFFECTIVELY?

A CAM may be responsible for more than one CA. The key is that the CAM must be able to demonstrate effective control of the CA(s). The larger the staff, the more CAs open at the same time means the CAM, all other factors equal, has more difficulty demonstrating effective control. There are no dollar/span of management thresholds limiting a CAM's responsibility. A CAM's technical background, experience, and time devoted to the CAM responsibilities are the only limits/factors that guide how many and the scope of CA(s) one CAM can be responsible for. Generally, unopened future CAs are not the same concern as open CAs.

COMPLIANCE TESTING PROTOCOL BASIS

1. Identify "Major" control accounts (CA) if the following are met: CA > 7% of Total BAC (and) CA > 10% of Period BCWS
2. For each major CA, assess span of control by monitoring consecutive CA level VAR trips for period SV or CV at +/- 10%.
3. If a CA trips a VAR for period SV or CV, for (3) consecutive months, a "Red" will be recorded for the project.
4. If CA trip continues, a project level ribbon chart will show "red", and will continue until the CA level is within the metric threshold.

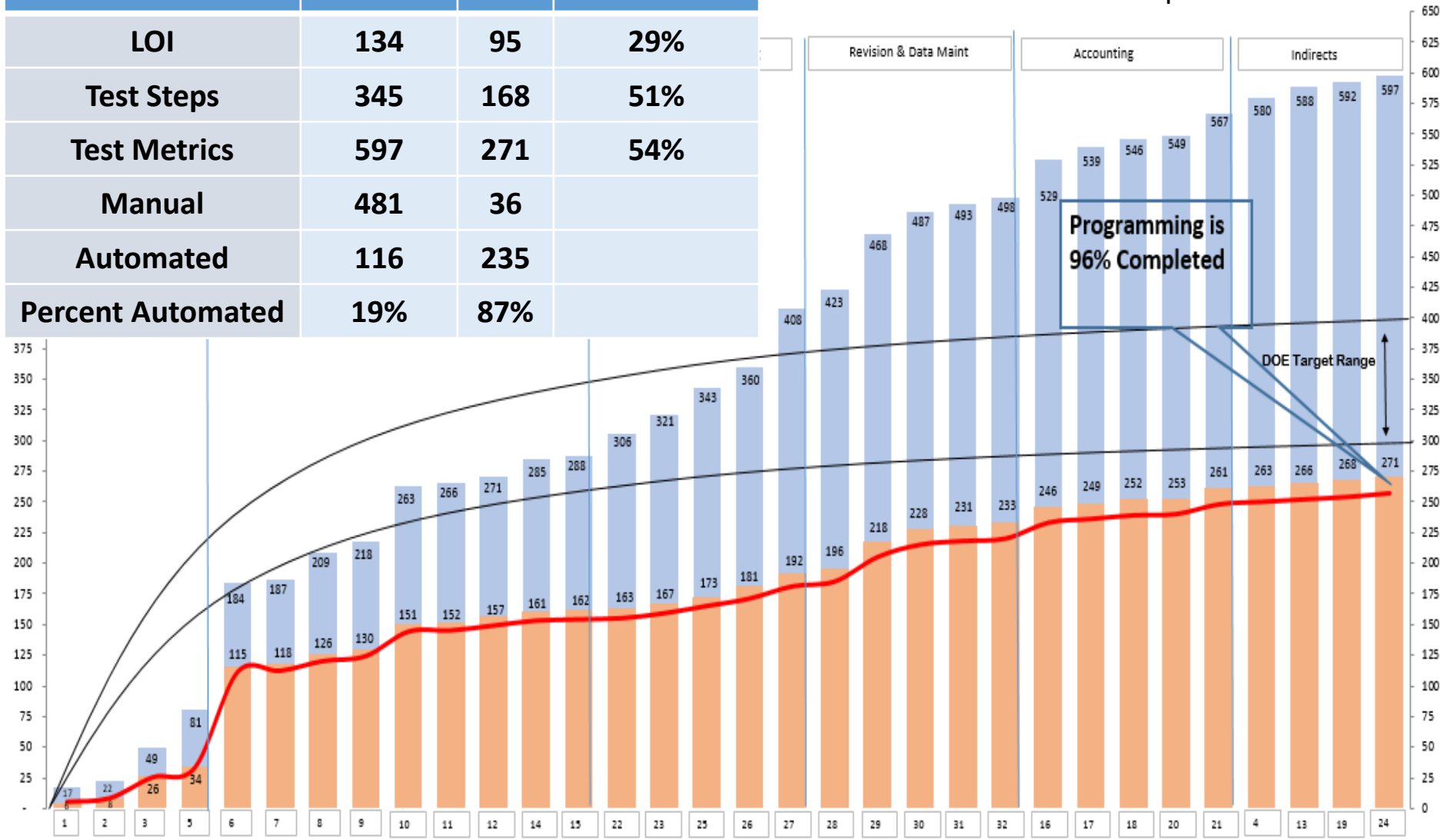
EVMS Compliance Automation (Cont.)

- **Stage 1: Limited Engagement**
  - Minimize additional surveillance activities
- **Stage 2: Investigation**
  - When any test exceeds the thresholds, contractor to investigate
- **Stage 3: Corrective Action**
  - If the issue continues, contractor to execute root-cause analysis and corrective action plan

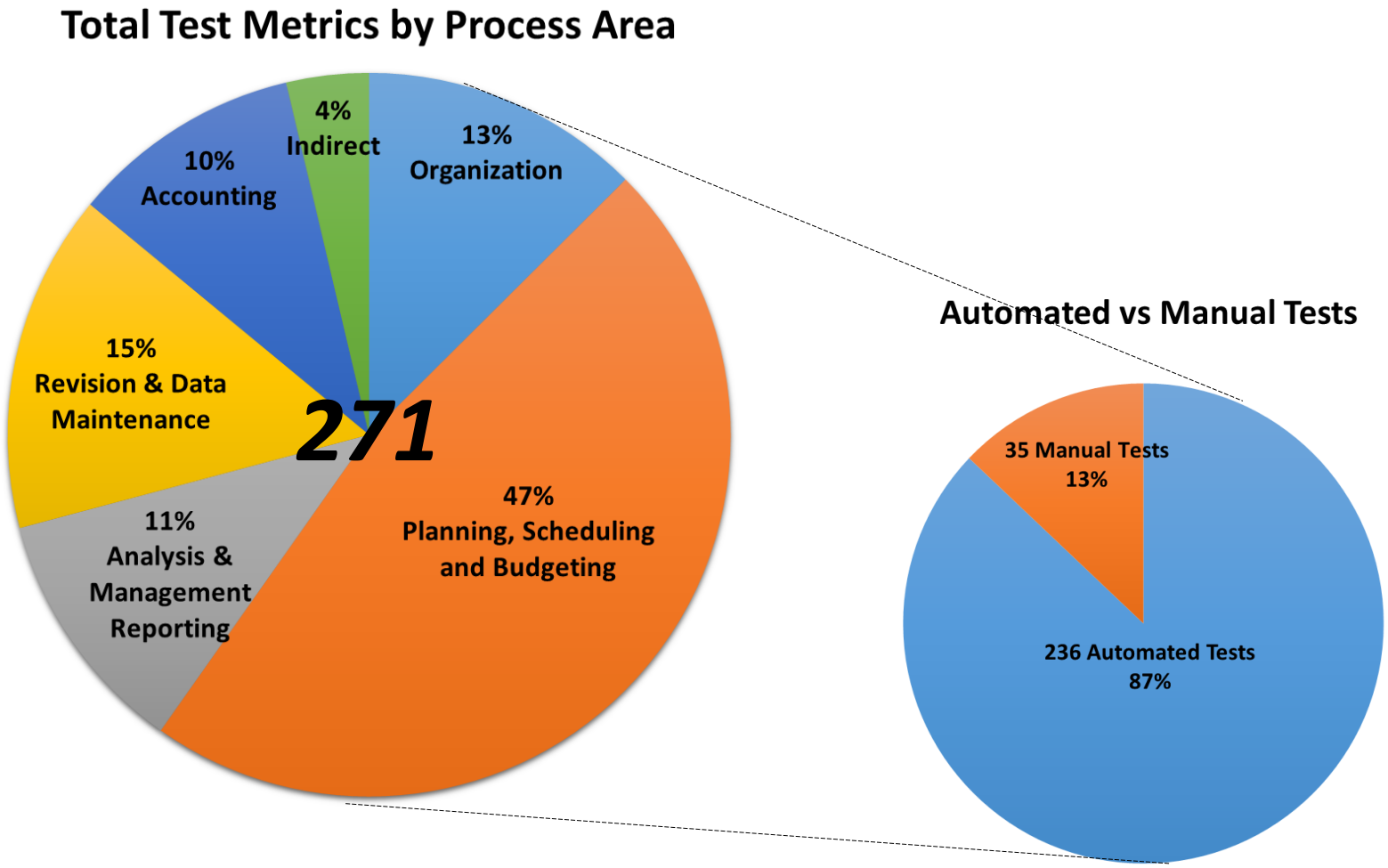
QELOI Test Stats

	IH 2.0	Pilot	% Reduction
LOI	134	95	29%
Test Steps	345	168	51%
Test Metrics	597	271	54%
Manual	481	36	
Automated	116	235	
Percent Automated	19%	87%	

Updated 1.25.17



EVMS Pilot Results



Topics, Techniques, and Quality Checks

- **Planning and Scheduling - Vertical and Horizontal Traceability**
- **Schedule Levels of Detail – Durations**
- **Planning Horizons**
- **Material and Procurement Planning**
- **Pitfalls of Late Date Baselining**
- **Non-Baseline “ETC” Activities - Forecast**
- **Objective Measures tied to Accomplishment**
- **Level of Effort Planning**
- **Management Reserve Usage**
- **Change Control**

QELOI Tests

	QE-LOI: 6.A.4 Are significant and probable risk mitigation steps included in the Prime's schedule and do these steps align with defined mitigation activities in the risk registry?									
	6.A.4-1.1 Verify High/Moderate Risk Mitigation Activities Coded are in the Forecast IMS		M	> 5%	0%	0%				
	6.A.4-1.2 Verify High/Moderate Risk Mitigation Activities Coded are in the Baseline IMS		M	> 5%	0%	0%				
	6.A.4-1.3 Verify High/Moderate Risk Mitigation Activity dates are in the Risk Registry aligned in the IMS		M	> 5%	0%	0%				
	6.A.4-1.4 Verify High/Moderate Risk Mitigation Activity dates are in the Risk Registry aligned in the Baseline IMS		M	> 5%	0%	0%				
	QE-LOI: 6.B.1 Does the network schedule/IMS describe the sequence of work (horizontal integration) and clearly identify significant interdependencies that are indicative of the actual way the work is planned and accomplished at the level of detail to support critical path development?									
	6.B.1-1.1 Verify all incomplete discrete effort is logically linked in the baseline IMS	F	A	> 5%	0%	0%				
	6.B.1-1.2 Verify the Start to Finish relationship is not employed in the Baseline IMS	F	A	> 0	0	0				
	6.B.1-1.3 Verify the SS and FF relationships are minimized in the Baseline IMS *(Excludes Milestones)*	F	A	10%	41%	47%				
	6.B.1-2.1 Verify all incomplete discrete effort is logically linked in the forecast IMS	F	A	> 5%	0%	0%			Authorized	
R	6.B.1-2.1 Verify all incomplete discrete effort is logically linked in the forecast IMS	F	A	> 5%	0%	0%			Total	
	6.B.1-2.2 Verify the Start to Finish relationship is not employed in the forecast IMS	F	A	> 0	0	0			Authorized	
R	6.B.1-2.2 Verify the Start to Finish relationship is not employed in the forecast IMS	F	A	> 0	0	0			Total	
	6.B.1-2.3 Verify the SS and FF relationships are minimized in the Forecast IMS (Excludes Milestones)	F	A	> 10%	56%	50%			Authorized	
R	6.B.1-2.3 Verify the SS and FF relationships are minimized in the Forecast IMS	F	A	> 10%	33%	31%			Total	
	6.B.1-3.1 Confirm identification of SVTs in the Baseline IMS (SVT in activity name)	F	A	> 0	0	1				
	6.B.1-3.1 Confirm identification of SVTs in the Baseline IMS (code field)	F	A	> 0	0	0				
	6.B.1-3.2 Confirm identification of SVTs in the Forecast IMS (SVT in activity name)	F	A	> 0	5	0			Authorized	
R	6.B.1-3.2 Confirm identification of SVTs in the Forecast IMS (SVT in activity name)	F	A	> 0	5	0			Total	
	6.B.1-3.2 Confirm identification of SVTs in the Forecast IMS (code field)	F	A	> 0	30	0			Authorized	
R	6.B.1-3.2 Confirm identification of SVTs in the Forecast IMS (code field)	F	A	> 0	1263	0			Total	
	6.B.1-3.4 Count of SVTs that are resource loaded in the baseline IMS	F	A	> 0	0	0				
	6.B.1-3.5 Count of SVTs that are resource loaded in the forecast IMS	F	A	> 0	0	0			Authorized	

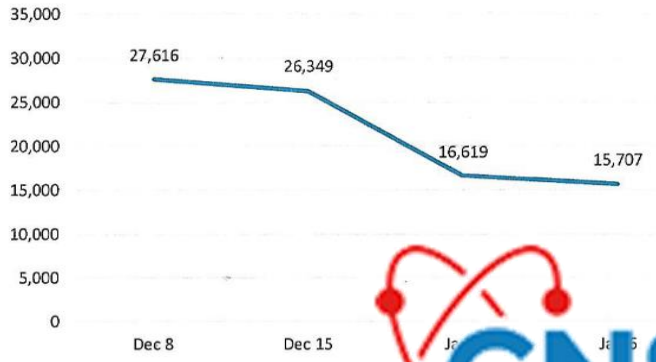
QELOI Tests

GL	TEST ID	TEST DESCRIPTION	DRILL DOWN	THRESHOLD	TRIP
1	1.A.1-1.1	Verify that the numeric CA/WP/PP WBS codes align between the WBS Dictionary and EVMS Cost Tool.	01_A_01-01_01_d	0.05	FALSE
1	1.A.1-1.2	Verify that the numeric CA/WP/PP WBS codes align between the IMS Flat File and the EVMS Cost Tool.	01_A_01-01_02_d	0.05	FALSE
1	1.A.2-1.1	Verify the Dollar value, at the CA/WP/PP WBS levels, align between the IMS Flat File and the IPMR/CPR Format 1.	01_A_02-01_01_d	0.05	FALSE
1	1.A.2-2.1	Verify the WBS Dictionary and Work Authorization scope statements align.	01_A_02-02_01_d	0.05	TRUE
2	2.A.1-1.1	Verify the dollar values at the functional categories align.	02_A_01-01_01_d	0	FALSE
2	2.A.1-1.2	Verify the total PMB dollar value is the same.	02_A_01-01_02_d	0	FALSE
2	2.A.1-1.3	Verify the RAM to the Cost Tool	02_A_01-01_03_d	0.05	FALSE
3	3.A.1-1.1	Verify physical percent complete aligns between IMS and EVMS Cost Tool for active WPs.	03_A_01-01_01_d	0.05	TRUE
3	3.A.1-2.1	Verify forecast start and/or actual start dates for incomplete CAs, WPs and PPs align between IMS and the EVMS Cost Tool (Excluding SVTs and Milestones).	03_A_01-02_01_d	0.05	FALSE
3	3.A.1-3.1	Verify forecast finish and/or actual finish dates for incomplete CAs, WPs and PPs align between IMS and the EVMS Cost Tool (Excluding SVTs and Milestones).	03_A_01-03_01_d	0.05	FALSE
3	3.A.1-4.1	Verify baseline alignment of hours between the WA and the EVM Cost Tool for WP, PP and CA.	03_A_01-04_01_d	0.05	FALSE
3	3.A.1-4.2	Verify baseline alignment of dates between the WA and the EVM Cost Tool for WP, PP and CA.	03_A_01-04_02_d	0.05	FALSE
3	3.A.1-4.3	Verify baseline alignment of dollars between the	03_A_01-04_03_d	0.05	FALSE
3	3.A.1-5.1	Verify the charge codes align at the CA/WP/PP l	03_A_01-05_01_d	0.05	FALSE
3	3.A.1-5.2	Verify baseline dates align between the	03_A_01-05_02_d	0.05	FALSE
3	3.A.1-6.2	Verify dates align between the IMS and the EVM	03_A_01-06_02_d	0.05	FALSE
3	3.A.1-6.3	Verify BAC aligns between the IMS and the EVMS Cost Tool for incomplete CA/WP/PPs.	03_A_01-06_03_d	0.05	FALSE
3	3.A.1-6.4	Verify EOC aligns between the IMS and the EVMS Cost Tool for incomplete CA/WP/PPs.	03_A_01-06_04_d	0.05	FALSE
3	3.A.1-6.5	Verify hours align between the IMS and the EVMS Cost tool for incomplete CA/WP/PP	03_A_01-06_05_d	0.05	FALSE
3	3.A.1-7.1	Verify baseline hours and total dollars at CA level align between BCP Log and WA.	03_A_01-07_01_d	0.05	FALSE
3	3.A.1-8.1	Verify the IMS forecast start and finish dates align with the ETC start and finish dates in the EVMS Cost Tool for active CA/WP/PPs.	03_A_01-08_01_d	0.05	FALSE
3	3.A.1-9.1	Verify the RAM dollar values align to the CPR Format 1 Dollar Values.	03_A_01-09_01_d	0	FALSE
5	5.A.1-1.1	Verify the EVMS Cost Tool has only one OBS assigned to each CA.	05_A_01-01_01_d	0.05	FALSE
5	5.A.1-2.1	Verify the EVMS Cost Tool has only one WBS assigned to each CA.	05_A_01-02_01_d	0.05	FALSE
5	5.A.1-3.1	Verify if there SLPPs that the PMB-Total CA Budget-UB = SLPP value.	05_A_01-03_01_d	0	FALSE
5	5.A.2-1.1	Verify there is a CAM assigned to each CA and is in alignment with the IMS and EVMS Cost Tool.	05_A_02-01_01_d	0.05	FALSE
5	5.A.3-1.1	Verify the CAM assignment aligns between the RAM and Work Authorization.	05_A_03-01_01_d	0.05	FALSE
5	5.A.5-1.1	To verify effective CAM Span of Control, identify the Major CAs (> 7% of the total BAC and >10% of the period BCWS) and if the current period SV% and/or CV%	05_A_05-01_01_a	0	TRUE
6	6.A.1-1.1	Verify the WBS is aligned in the EVMS Cost Tool and the Baseline IMS, for incomplete discrete WP/PPs.	06_A_01-01_01_d	0.05	FALSE

Summary | 29_C_02_01_02_d | 01_A_01_01_01_d | 01_A_01_01_02_d | 01_A_02_01_01_d | 01_A_02_02_01_d | 02_A_01_01_01_ ...

QELOI Tests

1. SS/FF Rels

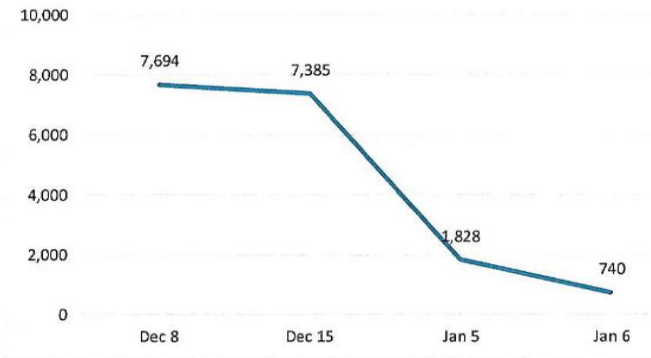


From December 8th to January 6th, the total number of SS/FF relationships has decreased by 43% (11,909).

2. High Float

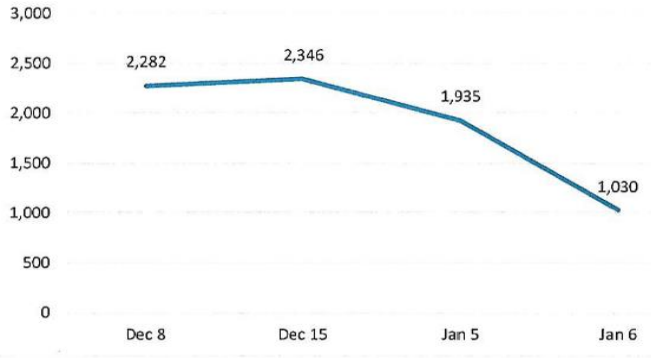
From December 8th to January 6th, activities with high total float have decreased by 90% (24,573).

3. Soft Constraints



From December 8th to January 6th, activities with soft constraints have decreased by 90% (6,954).

4. In FC Not in BL



From December 8th to January 6th, activities in the forecast that are not in the baseline have decreased by 55% (1,252).

Future State

- **QELOI value weightings for appraising the maturity of an EVMS**
  - Similar to how FICO® Scores, an EVMS maturity score can reflect how important each QE-LOI category is in determining how compliant or non-compliant your EVMS is at any point in the project life-cycle

- **QELOI weightings can be adjusted accordingly to best implement the EVMS through the different phases of the project**

SOURCE: TURBO TAX

CNS EVMS Compliance Automation Demonstration

- **Artifacts: 15**
- **Flat Files: 26**
- **Data Elements: > Million**
- **Calculation and Insights: Just Minutes!**